Resource Action: EWG-84A	**Task Force Recommendation Category: 1**

Construct New Feather River Hatchery Settling Ponds to Prevent Potential Leaching of Contaminants to the Feather River

Evaluation Team: Philip Unger and Anita Thompson, reviewed by Eric See and Jerry Boles.

Description of Potential Resource Action Measure:
New settling ponds would be constructed at the location of the existing Feather River Hatchery (FRH) settling ponds or in a different area. Design of the new ponds has not been determined, but design objectives include eliminating leaching of effluent from the ponds and removing hatchery wastes from the effluent by evaporation or water treatment facilities. There is probably too much water to evaporate. The hatchery effluent potentially contains contaminants such as organics, copper, formaldehyde and peroxide. The new ponds would be lined with an impermeable layer to prevent leaching. In addition, to accommodate the large volume of water regularly received from the hatchery, the ponds would have to be large and/or include water treatment facilities and a treated water conveyance system. Another option that could be considered, since contaminants (salt, copper, formaldehyde, etc.) are present only when hatchery water or fish are being treated, is to build a shunt system to divert treated water to another holding pond or treatment system (e.g., City of Oroville sewer) away from the river; "normal" (untreated) hatchery water could still flow to the ponds and subsequently percolate through the gravels to Hatchery Ditch. While treated water was unavailable for percolation through the gravels to Hatchery Ditch, a diversion in the plumbing at the hatchery could be made to run river water to the ponds (currently excess flows are returned to the river through a pipe, which could be modified to transport water to the ponds). This would require treatment of far less water (and perhaps none at all if it could be transported to the City sewer system).

Date of Field Evaluation:
Field evaluations were conducted by Phil Unger and Jason Kindopp on June 11, 2003.

Related Resource Actions:
EWG-84B is related to this action because it also addresses the concern that effluent from the hatchery settling ponds potentially contaminates Hatchery Ditch and the Feather River.

Nexus to the Project:
The FRH was constructed as mitigation for the loss of natural salmon and steelhead production that resulted from the construction of the Oroville Facilities. Therefore, effects of the hatchery on water quality are considered project effects.

Potential Environmental Benefits:
The benefit of and need for this resource action are questionable. The measure was proposed because water leaching from the settling ponds is potentially contaminated with hatchery wastes. The hatchery settling ponds were constructed on the gravel terrace that forms the north bank of the Feather River. Water from the ponds seeps through the bank to Hatchery Ditch, which flows into the Feather River. Lined ponds at the current or a different location would eliminate the leaching of water to Hatchery Ditch and the river. Water monitoring under SPW1 identified a high salt load in the settling ponds and Feather River downstream from the hatchery, which shows contaminants in the settling ponds can reach the river.

Potentially other contaminants from treating water and fish at the hatchery can reach the river and impact aquatic life. SPW1 also found levels of copper exceeding criteria for protection of aquatic life in the ponds and Feather River downstream from the hatchery (but not upstream). Toxicity tests also showed higher toxicity to survival and reproduction of Ceriodaphnia in the settling ponds and downstream from the hatchery than upstream or other stations. Data have not been developed, however, that indicate whether there is an impact to fish or other aquatic organisms actually living in Hatchery Ditch and the Feather River. While criteria designed to protect aquatic life may have been exceeded or toxicity was found to bioassay test organisms, this does not necessarily mean that aquatic life in the river are actually impacted. Percolation of the settling pond water through the levee gravels may filter or facilitate break down of contaminants originally present, thus purifying the water before it enters the ditch.

The effluent that leaches from the settling ponds is the principal source of water for Hatchery Ditch, which contains excellent spawning and rearing habitat for steelhead trout. If this source of water was eliminated, a new water source would have to be found for Hatchery Ditch.

Potential Constraints:
The principal potential constraint on this measure is the potential loss of Hatchery Ditch's water supply. Hatchery Ditch is a major habitat for spawning and rearing steelhead trout. Eliminating seepage from the settling ponds to the ditch without providing a different source of water would most likely destroy this habitat. Other potential constraints include: 1) finding a new location large enough to accommodate a settling basin using evaporation to eliminate excess water and/or 2) the high cost of treating the effluent and conveying it back to Hatchery Ditch.

Existing Conditions in the Proposed Resource Action Implementation Area:
The FRH settling ponds currently lie on gravel substrate along the top of the Feather River levee that adjoins the hatchery. They were designed to capture the FRH effluent water in a low velocity pond, allowing solids to settle out as the water is discharged from the surface at the downstream end of the pond. Periodically, the ponds would be drained and the sediments removed from the bottom of the pond. Currently, FRH effluent flows into the settling ponds and rapidly seeps through the gravel at the bottom

of the ponds and into Hatchery Ditch. Percolation of the water through these gravels likely filters some FRH contaminants, but apparently not all (which potentially includes organics, copper, formaldehyde, and peroxide) from the water. The settling pond effluent is a major source of water for Hatchery Ditch.

Hatchery Ditch is a stream that flows on a gravel bar in the Feather River immediately downstream of the FRH. The stream was probably formed from a river side-channel that captured the outflow from the settling ponds' seepage. Results of recent sampling indicate that Hatchery Ditch may be the most productive steelhead spawning and rearing habitat in the river. The stream receives much or all of its flow from the leakage of the FRH settling ponds.

Recent sampling by DWR in Hatchery Ditch downstream of the settling pond effluent discovered elevated salt and toxicity issues, though this does not necessarily mean that aquatic life in the river is impacted.

Design Considerations and Evaluation:
Major design considerations for the new settling ponds would include how to accommodate the large volume of effluent received from the hatchery and how to remove contaminants from the water (water treatment facilities or settling and evaporation). Ponds constructed at a new location might have to be lined to prevent potential leaching of contaminants into the groundwater. An especially important design consideration would be to ensure uninterrupted water supply for Hatchery Ditch. This could be accomplished either by conveying treated water back to the ditch or by developing a new source of water. Another water source could be to design a channel to carry water from upstream in the Feather River to the Hatchery Ditch.

The efficacy of this resource action would be evaluated by regular water quality monitoring of any effluent from the settling ponds. Finally, DWR's current monitoring program for steelhead spawning and juvenile rearing should be continued to ensure that any change in the water supplied to the ditch has no adverse effect on the steelhead population.

Synergisms and Conflicts:
This resource action is intended to be compatible with the following EWG resource goals: 1) maintain and protect water quality for all beneficial uses, 2) improve habitat for anadromous and resident fish, and 3) minimize hatchery impacts on anadromous salmonids and resident fish. However, as noted previously, there is no evidence that adopting this measure would contribute to any of the goals and, in fact, unless measures are taken to ensure that Hatchery Ditch has an adequate supply of clean water, the action could actually conflict with these resource goals. This resource action is similar to, but less well defined than, EWG 84-B.

Uncertainties:
The principal uncertainty of this measure is whether or not there is a need for it. At present, there is no evidence that the hatchery effluent is harmful to the aquatic life in the river (see above). This uncertainty needs to be resolved before making any change to the settling ponds. Other uncertainties include the volume of hatchery effluent that would need to be treated or evaporated, and the cost and feasibility of dealing with this volume of water. Also, if this measure required finding an alternate source of water for Hatchery Ditch, it is uncertain where this source would be found. Even if another source were found, it could be difficult to ensure that the existing flow and habitat conditions for steelhead would be maintained.

Cost Estimate:
Cost would depend on location and design of new settling ponds, methods for removing contaminants and conveying water, and the need and procedure for developing a new water supply for Hatchery Ditch. Cost would likely vary, and could range from $100,000 to $1,000,000.

Recommendations:
SPW1 identified elevated salt loads and toxicity to test organisms, though this does not necessarily mean that aquatic life in the river is impacted. This resource action should not be evaluated any further. Additional monitoring in the pond and hatchery ditch is recommended (e.g., monitor before and after hatchery treatments to determine how much of the treatment such as copper, formaldehyde, salt, etc, reaches the river; monitor periphyton and invertebrate populations in Hatchery Ditch and compare to populations in the river upstream from the influence of the ponds to determine if hatchery treatments are affecting life in Hatchery Ditch).